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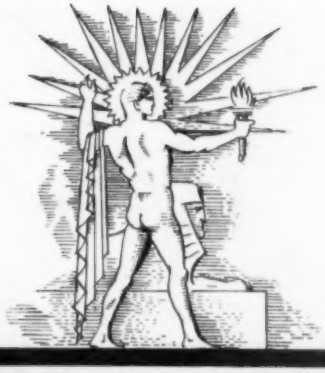
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



September 3, 1938

Scanning a Star

See Page 154

A SCIENCE SERVICE PUBLICATION

Do You Know?

Central China has sacred forests which remain in their primitive state, unchanged by man.

Dairy industry historians tell us cows for Plymouth Colony were brought from Devonshire in 1624.

As early as 320 B.C., a Greek made a voyage of exploration to the North, possibly reaching Iceland.

The Federal Bureau of Investigation has a file of the "fingerprints" of various kinds of auto tire treads.

The Swedish Government has ordered electric sirens of an improved type for warning use in case of air raids.

A bouquet of flowers is prescribed once a week for every patient in the University of California Medical Center.

The Hebrew University of Jerusalem has the original manuscript of the Einstein theory of relativity, presented by Prof. Einstein.

Government scientists say that apples in dry years are smaller and less juicy than apples in rainy years, but the small apples store better.

For no known reason, the farther the deer mice of Georgia Strait islands, British Columbia, are separated from the mainland the shorter their tails and the longer their bodies become.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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Brazil has clamped down on nationalistic foreign settlements; no settlement in Brazil may have more than 25 per cent. of one foreign nationality.

SCIENCE NEWS LETTER

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ARCHAEOLOGY

Athenian Agora Yields New Archaeological Finds

Quaint Hedgehog Figure Explained by Modern Folk Belief; Satyr Tries to Drink From Wrong End of Wine Vessel

PILFERING habits of the Grecian hedgehog caused him to be immortalized 2300 years ago in the form of a terra-cotta figure that was recently dug up in the Athenian Agora, or market-place.

Final report of the eighth season of Agora excavations by the American School of Classical Studies in Athens was made by Dr. T. Leslie Shear, director of the work and professor of classical archaeology at Princeton University. Dr. Shear has recently returned to America.

Most unusual of his finds this spring was the hedgehog of the fourth century B.C., which he describes as having "round knobs scattered over the body, three on each side and four along the spine. The knobs have an alternate arrangement of either round holes or shallow grooves."

The scientists were at a loss to explain the knobs until one of the workmen declared that hedgehogs come to his vineyard and spear grapes on their quills, carrying them off for their young to eat.

Equally surprising was the discovery of a vase fragment decorated with the picture of an intoxicated satyr breaking through the bottom of a wine vessel. According to Dr. Shear, "the comic composition is due to the fuddled imagination of an inebriated brain."

Not only did the ancient Athenian artists occasionally take to drink, but they evidently had trouble themselves in interpreting the complicated mythology of the day, for on one of the vases described by Dr. Shear there occurs a mixture of legends.

"A beardless youth, who is armed with a double axe, is represented as engaged in combat with a man who is leaning down to grasp a rock. The youth with the double axe would normally be interpreted as Theseus, but beside him a knotted club is resting on the ground and a quiver is hanging from the branch of a tree.

"It therefore seems probable that this scene represents a contamination of the legends of Herakles and Theseus, the Athenian hero replacing Herakles on an Attic vase," he concludes.

Outstanding historically this season was the investigation of the Klepsydra, a fountain house at the foot of the slope to the Acropolis, which had kept the citadel's defenders supplied with water from the fifth century B.C. to the Greek war of independence in the 1820's.

Entered through a fissure high in the wall of the building, the well-house gave evidence of being first built during the fifth century, at which time it consisted of a large forecourt with an antechamber for drawing water.

During the Hellenistic period (third to second century B.C.) the building was partially reconstructed, only to be filled with debris of battle after the siege of Sulla in 86 B.C. and to cave in early in the Roman period.

However, in the second century A.D. the fountain-house was rebuilt and connected directly with the Acropolis by a stairway cut through the rock bastion, and the Valerian wall was thrown around it. It remained so, according to Dr. Shear, until the Greek war of independence, when the Bastion of Odysseus was built around the spring to defend it from the Turks.

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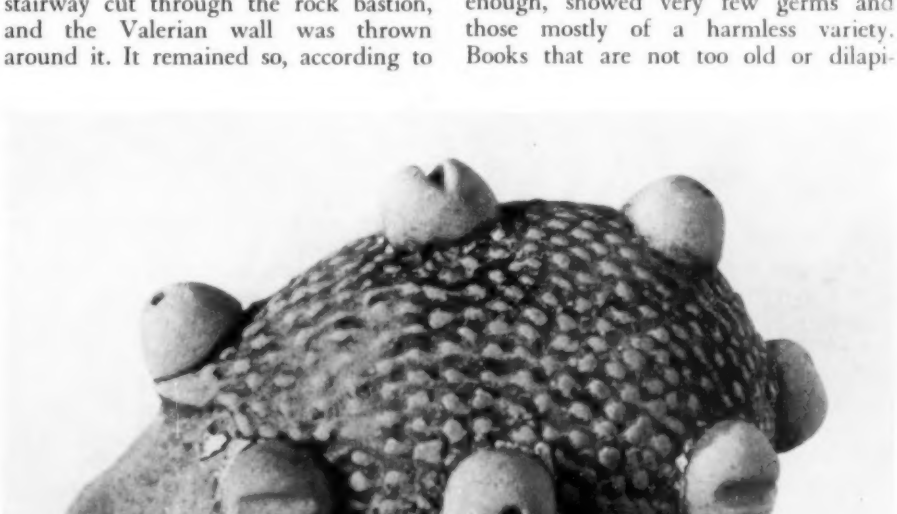
BACTERIOLOGY

School Books Not Likely To Carry Disease Germs

EVERY so often in some community comes up the question of disease germs being spread by school books. This is only natural since books handled by patients having tuberculosis, scarlet fever, diphtheria, meningitis, infantile paralysis and kindred diseases are more than likely to get some of the germs on them either from the patient's breath in sneezing or coughing or from his hands.

A pretty clean bill for ordinary school books, however, and some recommendations on books in general are now presented by Arthur H. Bryan, of the science department of Baltimore City College. He collected pages from very old and from newer school books, most of which had been recently used by students, cut up the pages, soaked them and shook them in sterile water for from 15 minutes to one hour, and then transferred some of the water to germ growth media to get some idea of how many germs actually had been on the pages of the books.

Ordinary school books, surprisingly enough, showed very few germs and those mostly of a harmless variety. Books that are not too old or dilapi-



SHARP LITTLE THIEF

Folk-belief that hedgehogs steal grapes by spearing them on their spines made possible the identification of this little terra-cotta image made in Athens 2300 years ago.

dated, he concluded, are not serious carriers of infectious diseases. School books that are kept for some time before being redistributed do not seem to have many living disease germs on their pages. Old books with visible dirt and grime smeared over their pages are capable of harboring many more disease germs than clean or new school books.

Mr. Bryan recommends that old school books which are frequently exchanged should be opened up and sunned for several hours. Books used by sick children should not be handed out to other students immediately (most germs die or lose their virulence if kept away from body tissues for a while.) Books which are dilapidated, out of date and filthy with grime should be destroyed. Books coming back from quarantined homes should be destroyed or held for several months before redistribution.

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SOCIOLOGY—ECONOMICS

Future Social Security Costs Cannot be Estimated Exactly

Figures for 1980 Subject to Factors at Present Unknown; Transfer of Interest to Problems of Present is Urged

GOVERNMENT officials have no accurate idea how much the Social Security old-age insurance will cost forty years from now. Such estimates have been reported frequently.

Despite intricate calculations, or perhaps because of them, Consulting Actuary W. R. Williamson, of the Social Security Board, confesses that it is impossible now to predict the exact cost of the plan when 1980 rolls around.

First among the uncertainties is the number of men and women who will survive to the age of 65 in future years. Mr. Williamson does not wish to rely on the experience of insurance companies in making this estimate, because the insurance companies' medical examinations and other factors make the situation of the life insurance holder different from that of the general population. A margin of safety for the insurance company in figuring death payments becomes just the opposite when the object is to figure life annuities.

New discoveries in medical science may reduce the deathrate from old-age diseases. Such advances would add to the cost of old-age insurance. Invention of new contraptions like the automobile and airplane, on the other hand, might increase the likelihood of accidental death, thus reducing the cost of old-age payments.

War would entirely upset predictions of survival and would reduce costs of the plan.

Another uncertainty is the number of individuals covered.

"There is as yet no clear evidence of the exact number of covered workers or approximate full-time jobs," says Mr. Williamson in his report. (*Social Security Bulletin*, July)

In connection with the framing of the Social Security Act, it was estimated that the annual covered pay roll for 1937 would be in the neighborhood of $28,000,000,000, representing between 25,000,000 and 26,000,000 full-time jobs. So far 40,000,000 benefit account numbers have been assigned, and it is estimated that wage reports received for the first six months of 1937 represent 32,000,000 persons for whom tax payments have been made by employers.

"There is a recognized lag in tax collection," comments Mr. Williamson. "Even though such employment changes as are now developed were accurately recorded, one can hardly believe that the tempo of the period of 1937 and 1938 is indicative of the situation during succeeding decades.

Officials expect some movement between the covered and non-covered occupations. It is estimated that at present only some 25,591,000 workers, out of the total of about 48,830,000 gainfully employed, are covered by the old-age plan.

It may very well be that the future will see more and more housemaids deserting the kitchen for the factory and small store keepers seeking employment in the chains where they will be eligible to old-age benefits.

Experts trying to estimate how many will be included in the plan by 1980 have made guesses ranging from 35,000,000 to 75,000,000.

Of course the present boundaries between the covered and excluded occupations may be shifted, too. Amendments to the act may bring agricultural or domestic workers under the plan or may change the age at which the payments are started.

A third uncertainty is the number of those who remain in employment beyond the 65-year age limit and thus delay the old-age payments. In making the early estimates for the social security plan, it was thought that an average of two and a half years of delay in retirement could be assumed. But when the worker is sure of an income at the age of 65, his attitude and that of his employer may change and alter the whole picture. Opposed to this tendency would be any increase in health of older men or raising of the standards of living. Benefit payments are low.

Part-time employment in the covered occupations adds yet another uncertainty to the estimation of costs, for the benefits of such workers will be larger in proportion to their taxes than will those of long-term members of the plan.

Finally there are the less tangible and immeasurable political and economic influences that may force drastic changes in structure of the plan.

Summing up all the difficulties, Mr. Williamson urges less emphasis upon the attempt to evaluate future costs.

"This major indefiniteness, therefore, must be accepted as inherent in any social insurance plan. . . .

"This indeterminate quality of old-age insurance costs may itself be the strongest argument for shifting our attention from the problems of 1980 to a more thoroughgoing consideration of present needs. We cannot foretell the future, but we can see the necessities of the present. A shift in attention should be most rewarding."

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PHARMACOLOGY

Pharmacology Research Institute Organized

INTENDED to occupy in pharmaceutical science the place of famous industrial laboratories in the fields of physics, chemistry and engineering, a Squibb Institute for Medical Research is being organized by E. R. Squibb and Sons. The new institute, to be staffed by scientists assembled from leading institutions in the United States and abroad, will occupy a newly-completed $750,000 laboratory located at New Brunswick, N. J. It is expected to be in complete operation this fall.

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VEST-POCKET SUN

New mercury vapor arc lamp, no bigger than a cigarette, is surrounded by rapidly flowing water to keep it cool while it radiates light one-fifth as brilliant as the sun's.

METALLURGY

China's Tungsten Monopoly Broken by Molybdenum

CHINA, once the dominant factor in the world tungsten market, has been losing her dominant position because of the growth of tungsten production elsewhere and through the emergence of a rival material, molybdenum, Kurt Bloch has reported to the American Council of the Institute of Pacific Relations.

Useful not only for the delicate filaments of incandescent electric lamps, but in the manufacture of magnetic and tool steels and armor plate, tungsten until recent years was very nearly a monopoly of the Chinese government. Large deposits of tungsten ore are located in Southern China.

Production of molybdenum, three-quarters of which is produced in the United States, has increased from 35,000 tons in 1930 to 121,000 tons in 1934, Mr. Bloch reports. Molybdenum, cheaper than tungsten, belongs to the same family of elements in the periodic system and therefore has roughly similar properties.

Feverish rearmament efforts, particularly by Germany and Russia, forced the price of tungsten during the 1933-35 period to a high level, thus increasing the competition of molybdenum and world production as well. Establishment of Nanking sovereignty over the Canton government in 1936 and a barter deal with Germany resulted in diversion of most of China's tungsten to Germany and from the European market. Publication of the British White Paper on rearmament in February, 1937, resulted in a wild tungsten boom.

Outbreak of the Sino-Japanese war led to the belief a tungsten famine was in sight and the price of the metal soared to a level only a little below that of silver. Action by the German government in ordering the use of molybdenum as a substitute for tungsten and in releasing some of its huge stocks to profit from high prices resulted in lowering the price of the metal.

Production from other ores, notably from ores in Bolivia, plus the increasing competition of molybdenum, indicates that there will be no repetition of the sky-high tungsten prices of a year ago.

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GEOLOGY

Research on Minerals Scheduled for TVA

MINERAL resources of the Tennessee Valley, other than metals, are to be investigated in a new experiment station to be established by joint arrangement of the U. S. Bureau of Mines and the Tennessee Valley Authority. The Valley's great wealth of non-metallic minerals, such as clays, mica, and quartz, together with the abundance of low-cost power available, make it a favorable region for such research.

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ENGINEERING

New Midget Arc Lamp Rivals Sun in Brightness

A "MIDGET SUN" in the form of a 1000-watt mercury arc lamp whose brightness is one-fifth that of the sun's surface and is yet no larger than a cigarette is announced by the General Electric Company and the Westinghouse Manufacturing Company.

Consisting of a small quartz tube whose tiny bore contains a globule of mercury, a trace of argon and the necessary electrical contacts, the new lamp's light source is approximately 12 times as brilliant as the incandescent filament of the standard 1000-watt projection lamp, company engineers declare.

It will find wide use in photo-engraving work, in blueprinting, photo-enlarging, in searchlights, and for therapeutic applications, they predict.

The lamp is watercooled because enormously high pressures and heat are developed in producing its brilliant light. Three quarts of water a minute flow past the midget through a special water jacket. A pressure-operated switch and magnetic valve turn the water on before the lamp is lighted and turn off the lamp in the event of failure of the water supply.

The light given off by the arc, about the size of a common pin, is stated to be whiter than that emitted by the conventional mercury lamp.

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PSYCHOLOGY

Mental Stock Market of Intelligence Explained

IF THE stock market baffles the layman with its cryptic bid and asked figures and abbreviated designations of companies, even more does the mental "stock market" of intelligence rating puzzle the uninitiated.

School children and their parents, too, may well wonder what the A's and B's and E's on the report card mean in terms of mental ability. The answer usually is, not too much. More exact is a child's intelligence quotient, commonly known by its symbol I. Q. If you wish to know whether your child's I. Q. indicates genius or just average, here is the key to the mystery.

Intelligence, like freckles, is unevenly distributed. But like most things in nature, intelligence is so spread that most persons have just a normal amount.

The par value of mental stock, as

DOLLARS FROM HEAVEN

Radiometeorographs, which are featherweight robot weather observatories, are carried high into the upper atmosphere by small unmanned balloons. The tiny radio sets they carry automatically send messages back to the scientists who launch them. At the top limit of flight, the balloons burst and the radiometeorographs are carried gently back to earth by parachute. Since the instruments are moderately costly, the companies that make them and lease them to the Weather Bureau offer rewards, which may be as high as $20, for their return. These boys are examining the treasure trove that dropped into their own front yard.

CHEMISTRY

Method Needed For Detecting Oxygen Lack

LACK of any simple, quick means of detecting the absence of oxygen is imperilling the lives of fire fighters, declares Dr. Harrison E. Howe. (*Industrial and Engineering Chemistry,* Sept.)

"Equipped as departments now are with protective masks, they are naturally called upon to make rescues of men overcome by toxic gases. But this often brings them into an atmosphere so deficient in oxygen as to be fatal," says Dr. Howe.

Oxygen-supplying apparatus is available, but it is so bulky and heavy as to be difficult to use in many situations. The protective equipment with which fire fighters are fitted removes toxic gases, but it does not supply oxygen.

"One thinks of the safety lamp used by miners, the possibility of carrying a cage of canaries or the advice sometimes given to farmers to lower a lighted lantern into a silo, but we must do better than that," Dr. Howe continues.

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expressed in I. Q., is the same as it usually is in the language of Wall Street, 100. The range of 10 points on either side of that I. Q. score of 100 is just what the greatest number of normal healthy American boys and girls might be expected to rate.

If your boy rates between 110 and 119, he is bright. If he stands between 120-129, he is very bright. If above 130, you are justified in calling him gifted. If he should tip the mental scales at 180 or more, you may term him a genius. Of such, Dr. Harvey Zorbaugh at New York University, estimates there are only about two dozen in all New York's million school children.

At the other end of the scale, those rating between 80 and 89 are backward, 70 to 79 borderline, and below 70 feebleminded. The mentally defective are again divided into morons, 45 to 69, imbeciles, 20 to 44, and idiots, 0 to 19.

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• Radio

Every Friday at 7:30 p. m. EDT, 6:30 p. m. EST, 5:30 p. m. CST, 4:30 p. m. MST, or 3:30 p. m. PST, Science Service cooperates with the Columbia Broadcasting System in presenting over the Columbia coast to coast network a new series of "Adventures in Science" presenting dramatizations of important scientific advances and discussions by eminent scientists.

PSYCHOLOGY

The Child Who Can't Learn May Be Behavior Problem

DEFIANT, restless, truant, and subject to temper outbursts. That is a picture of what school officials know as a "problem child."

It is also a typical picture of a child who has failed in learning to read, write and cipher—particularly to read, Dr. Charles L. Vaughn, of Detroit's Psychopathic Clinic, has learned from a study of boys at the Wayne County Training School.

These boys were from 12 to 15 years old and yet tests showed them to be below grade three in reading. In other words they had spent about nine years in school trying to learn to read, without success.

It is hard to realize the insult that such a prolonged failure is to the sensitive nature of a child. If he cannot learn to add, that is to some extent at least a private matter between his teacher, his parents, and himself. He can hide those arithmetic papers with the damning zeros.

But when it comes to reading, he is asked to stand up before the whole class and demonstrate almost daily his weakness.

If you have struggled with an income-tax blank, a difficult cross-word puzzle, or one of those baffling Oriental cut-up puzzles, you know the exasperation that can result from failure even when no audience jeers at your mistakes.

A child should not be forced to learn to read and to try to master other school subjects until his mind has matured sufficiently to make it possible, is Dr. Vaughn's conclusion.

Teachers should try new methods of instruction with the child who is not learning, or else the child should be given another type of program, such as handwork, that he can master.

No child should be forced to submit to ignominious failure until his whole personality is disorganized, and catastrophe brings him to the psychopathic clinic.

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GENERAL SCIENCE

Gold-Plated Silk Shown To British Scientists

Synthetic Sex Hormones, Man-Like African Ape, Hooked Noses on Basic White Race, Discussed at Cambridge

GOLD, real gold, will luxuriously swathe milady when she glides out onto the dance floor or makes regal entrance at the opera. For a way to make gold cloth that costs no more than good quality silk was demonstrated at the meeting of the British Association for the Advancement of Science at Cambridge.

The fabric is really gold-plated silk. Silk goods is used as a base. This is covered with a solution of an organic compound containing gold. The compound is then decomposed chemically, leaving pure gold behind. Estimated cost is about three dollars a yard. This relatively low figure is possible because the coating of gold is in a film whose thickness is measured in ten-thousandths of an inch.

By a similar process gold mirrors can be prepared, that are more beautiful than the present ones of silver and at the same time less costly.

Gold dresses that have passed out of fashion or are otherwise unsuited for further wear, and even dressmakers' scraps left over from their cutting-out, would be valuable for cashing in on the purchase of a new gold gown. The metal, like any old gold, can be reclaimed and re-used.

A Newer Alchemy

Love philtres, vended by old-time alchemists to yearning youths, have their counterparts in synthetic compounds produced by modern chemists. Substances not at all related to the natural sex hormones stimulate normal sex reactions, Prof. E. C. Dodds, of the University of London, reported.

Prof. Dodds was able to produce characteristic physiological changes in female animals with a whole series of organic compounds which he made in the laboratory. This "indicates that a complete change of view must be made on the question of the specificity of biological action," he remarked, adding, "The bearing of this on the whole question of hormones and vitamins is of the greatest importance."

In line with Prof. Dodds' suggestion, it appears possible that chemists may eventually be able to produce synthetically substitutes for the present costly and laboriously extracted "biologicals" much used in medicine, that will cost far less and yet be much more potent.

Dr. A. S. Parkes, also of the University of London, cited examples of male gland secretions, or hormones, that also had the power of stimulating underdeveloped female animals to normal growth and activity along the lines of their own sex. This falls in line with the lack of specificity in such substances discussed by Dr. Dodds.

Age of Civilization

Civilization's dawn—the time when men learned how to systematize food production and live in towns—recedes farther and farther into the mist of years the longer the problem of culture origins is studied, it was indicated in the address of Prof. V. G. Childe, president of the Association's section on anthropology. Recent German excavations in lower Mesopotamia show well-developed town life as far back as 4500 B.C.—long before the invention of writing. And the towns found buried beneath the ancient river plain show every evidence of having been built by peoples already civilized, who apparently migrated into the land from somewhere else, bringing their relatively advanced culture with them.

Evidence also increases, Prof. Childe declared, that there was a continuity of civilizations, with business and cultural contacts between the peoples, during all these uncounted centuries of unrecorded history. Archaeological finds all the way across Europe, from Macedonia to Scandinavia, give indications of these contacts far back into the Late Stone Age. East met West ages upon ages ago.

Difficult Skull

The fossil skull of a creature that might be the missing link between man and the common ancestor of apes and man, except for its geological youth, was described before the meeting in a communication presented on behalf of Dr. Robert Broom of the Transvaal Museum.

The skull is that of a unique anthropoid ape found in South Africa. It is the newest member of the strange family of anthropoid apes, previous forms of which were discovered by Dr. Broom and by Prof. Raymond Dart of Witwatersrand University. These animals existed in relatively recent geologic times, contemporaneously with genuine human beings of pleistocene or Ice Age time.

Sir Arthur Keith, noted English anthropologist, declared, "These discoveries have destroyed the fingerposts on which anthropologists have always depended to indicate the line between anthropoid and man."

Dr. Broom's latest-found skull, though distinctly anthropoid, has teeth that are human in structure and arrangement. On this point, Sir Arthur Keith remarked, "It is likely that these apes evolved more closely than the gorilla and the chimpanzee from the spot which gave rise to human beings."

Whether our present, acquired human gait was used also by these ancient anthropoids, walking as bipeds on South Africa's treeless plains during the pleistocene, cannot be decided until their lower limb bones are discovered.

Hook-Nosed Iranics

New headache for the new "racist" theories in Europe: The fundamental type of white men, who originated thousands of years ago on the plateau of Iran (Persia) had hooked noses! So declared an American scientist, Dr. Henry Field, of the Field Museum of Natural History in Chicago.

Dr. Field was brought to his conclusion through a study of three thousand Persians, by means of a new device for the mechanical sorting of anthropometric data. Fundamental traits were long heads and hooked noses. When intermarriages occurred with other types, the hooked nose won out; it dominated the countenances of the offspring.

A new method of inactivating plant disease viruses by both X-rays and ultraviolet radiation was reported on jointly by Drs. N. W. Pirie, of Cambridge University, and F. C. Wawden, of the Rothamstead Experimental Station.

Their discovery points the way to a possible future method of vaccinating plants against diseases such as mosaic, curly-top, and "frenching." It also indicates a way in which safer smallpox vaccine may be prepared. Irradiation enlarges the crystals that may be obtained from the viruses, and reduces their infectivity.

METEOROLOGY

Department of Meteorology Installed by N. Y. University

A DEPARTMENT of meteorology to conduct research and train weather forecasters and observers will be launched this month under the chairmanship of Prof. Athelston F. Spilhaus as part of the New York University College of Engineering. Equipment for the department will include the meteorological observatory at University Heights, which is a cooperative station of the U. S. Weather Bureau, and a mountain observatory on Mt. Whiteface, near Lake Placid, N. Y. The latter is operated jointly with the Rensselaer Polytechnic Institute. Gardner Emmons, associate meteorologist of the Weather Bureau in Washington, D. C., has been named assistant professor.

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LINGUISTICS

Gleichschaltung Ahead For German Pronunciation

GERMANS, to be properly patriotic nowadays, must all think alike. But an even harder task lies ahead, a task that will twist their tongues as well as try their souls. For the rulers of the Reich have decreed that pronunciation of the German speech is to be made uniform throughout the land. Sibilants must be standardized, gutturals *gleichgeschaltet*.

With characteristic German method, the job of compiling the big book that will make all German words sound alike has been assigned to a group of three professors, who are already Commisars (beg pardon! *Leiter*) of the Central Institute for the Preservation of Spoken Language of the German Academy in Munich.

They will issue, first, a small handbook, containing both native and adopted words in most common use. In a few years the *magnum opus* will be due, a massive *Handwörterbuch* that will contain *all* the words. After that there will be no excuse for deviating from the Nazi party line by so much as a slurred umlaut.

A writer in a German journal, *Volk und Welt*, enthuses:

"This definitely established German speech as laid down in the standard work will be the language of everyday intercourse, and it will also be the speech of the radio, the schools, the theater, the platform, the speech of public ceremonials, in short, the speech of the people, which everyone understands and everyone speaks."

This applies, of course, only to official High German, supposedly standardized centuries ago by Martin Luther, but really spoken with as wide a variety of local accents, from Munich to Cologne to Bremen to Koenigsberg, as you will find in American English over a like range of territory in this country.

An American, remembering past efforts to standardize our own pronunciation, will recall the range of accents from Boston to New York to Richmond to Pittsburgh. And if he knows any German, he may say, softly, *"Ja-sooooh?"*

Which, being translated, is "Oh, yeah?"

Science News Letter, September 3, 1938

ECONOMIC BOTANY

Japanese Pyrethrum Monopoly Menaced

THE HIGHLANDS of Kenya in East Africa, just south of Ethiopia, are the newest spot where attempts are being made to grow pyrethrum flowers, whose extract goes into insecticides that must be harmless to man and animal. Fly sprays are a major product using pyrethrum although it enters into the composition of certain garden sprays.

This bit of information may not set America tingling with its significance, but one can be sure that Japan is keenly aware of the African pyrethrum plantings because the little pyrethrum flowers form one of Nippon's much-prized cash crops.

Japan in fact produces about 95 per cent. of the world's pyrethrum, and the United States, using some 20,000,000 pounds a year, is half of the world market. In Japan, pyrethrum is comparable with cotton in the southern states as a cash crop.

A report in *Industrial and Engineering Chemistry* (July) on the Kenya pyrethrum plantings and harvest shows that the little flowers of African cultivation are superior, in their potency, to the Japanese variety. While pyrethrum plants have been grown in many parts of the world—California, Lancaster, Pa., and Colorado are three American examples—it is only in Kenya that a product superior to that of Japan is obtained.

Although the United States uses large amounts of pyrethrum, it is unlikely, in the near future, that it can be grown economically here.

Science News Letter, September 3, 1938

IN SCIENC

PSYCHOLOGY

Applied Psychology Course To Include Internship

A PROFESSIONAL course for psychologists that would include one year of internship comparable to that of a medical doctor is proposed for Columbia University, New York City.

Although a great many psychologists are engaged in private practice or are doing work of a professional rather than an academic nature in hospitals, clinics, and other institutions, their training has heretofore been overweighted on the side of theory and research, it was pointed out by Dr. A. T. Poffenberger, executive officer of Columbia's psychology department, who made the announcement.

Under the proposed plan, those wishing to become clinical or applied psychologists would take a program of post-graduate training including a first year similar to that leading to a master's degree; a second year heavy in field work, testing and test making, and psychopathology; and for the third year an internship in an appropriate institution.

Completion of the course would be rewarded by a professional certificate or possibly a "Ps.D." (doctor of psychology) degree. The Ph.D. degree would not be granted for this work, but would be reserved for those preparing to enter the field of scientific research rather than the practice of applied psychology.

Science News Letter, September 3, 1938

FORESTRY

Cedars of Mount Lebanon Endangered by Disease

CEDARS of Mt. Lebanon, famed for the part they played in the construction of Solomon's Temple, are threatened with extermination by a disease of unknown origin. A commission of the French government of the district is making every effort to save the trees.

Lebanon's cedars, which formed a huge forest when Solomon made his famous deal in timber with his father-in-law, King Hiram of Tyre, are now reduced to two rather small groups near the cities of Beirut and Tripoli, in Syria.

Science News Letter, September 3, 1938

NCE FIELDS

ASTRONOMY

Paris Planetarium To be Sold at Auction

ANY PERSON who desires to buy a second-hand Zeiss planetarium instrument, like those in Chicago, Philadelphia, New York and Los Angeles, may have the opportunity in Paris in October. The planetarium, one of two dozen in the world, was installed in 1937 as one of the attractions of the Paris Exposition.

Now, however, the Societé des Parcs d'Attractions, which operated it, is being liquidated, and the planetarium will be sold at auction. It is announced that bidding will start at 50,000 francs (about $1500). The price of a new planetarium is about $125,000.

Science News Letter, September 3, 1938

EDUCATION

Hygiene and Character Both Needed in Schools

TWO MODERN movements are designed to aid the pupil to fit himself into later life without conflict or maladjustment. Developing side by side, or sometimes apparently in competition for public favor, one is character education—the other mental hygiene.

To the uninitiated, they may seem to have the same purpose but only another name. Then why two movements?

The differences are mainly matters of the relative emphasis on the individual and on preventive measures, says Dr. Paul Murphy, psychologist of Kansas State Teachers College.

The mental hygienist, concerned with the psychological health, wholeness, and happiness of the individual, has been pushed by necessity into treatment of those who are already in difficulties.

The character educationist, stressing the social group rather than the individual, is concerned more with improving the environment of the child and so is led into the preventive aspects of what is known in both fields as proper "adjustment."

Why not merge the best features of both movements into a united effort for the good of our children, asks Dr. Murphy.

The idea of creative living—of finding new ways of living, not just conforming to old customs and conventions, is one emphasized by character education. But mental hygiene is basic in any effort at personality and character building, he points out.

Science News Letter, September 3, 1938

SOCIOLOGY

Urges That CCC Care for All Boys Leaving School

HUNGER, idleness, and no money for fun. That is the story back of much of the crime committed by modern youth.

To the clinic of a court in Detroit come daily young men of 18, 20 or even 24 or 25 who have never in their whole lives done a day's work. Never have they known the thrill of a pay check or the self-respect from holding a job.

Yet these boys had dropped out of school at 14 or 16. What have they been doing since? What was there for them to do?

The CCC is seen by Dr. Lowell S. Selling, director of the Psychopathic Clinic of Detroit's Recorder's Court, as a partial answer to the needs of these young men. In the CCC they can be given body-building work in the open air and could be given training in skills and citizenship as well. Life under pioneer conditions and wrestling with the forces of nature would give socially useful expression to their fighting impulses.

Not only should the CCC be enlarged in scope, but it should take in every American boy, excepting only those in professional training, Dr. Selling believes.

Although the organization should not become military, this psychiatrist advocates training in aviation and the use of firearms.

"One of the best ways of curing a potential young gangster of his love of firearms, and therefore his likelihood of committing a crime with a firearm, in my own experience, is to give him an opportunity to do a good deal of target practice," Dr. Selling said.

"Under properly trained supervision, boys learn how to handle firearms with safety to themselves and others; they learn to respect firearms, keep them clean, and lock them away when they are not using them, and they are impressed by the dangerousness of them in a way that they could not learn under any other condition."

Science News Letter, September 3, 1938

ECONOMICS

Bank's Research Service Aids Industry's Problems

THE BANKER is speaking to the industrialist:

"Where will your business be five years from today? Will it be bigger and sounder—occupying a more prominent and profitable position in your industry than it does at present—or will it be fighting for its very existence?

"The answers to these questions depend in part upon:

"What you do to make your present products better, less expensive and more serviceable than they are today.

"What new and profitable items you add to your present line.

"The facility with which you adapt your plant and your resources to new developments and changing conditions.

"All of these factors will be vitally affected by the developments that are taking place in the great research laboratories of the world—some of which are so revolutionary that your very business life may depend upon your ability to avail yourself of them."

Such language catalyzes interest in research and moves the industrialist to action. Bert H. White, vice-president of Liberty Bank of Buffalo, established that institution's research advisory service after participating in laboratory tours in this country and abroad sponsored by the National Research Council.

Some 700 laboratories are cooperating in this service, performed gratis to customers and non-customers alike, and the service is now available to other banks in industrial areas.

Science News Letter, September 3, 1938

PHYSICS

New Device Shuts Sound From Ears of Sleepers

SLEEPERS, who have eyelids to shut out undesired light when bedtime comes but who have no earlids to perform an analogous function, may soon be wearing ear defenders designed by Dr. Vern O. Knudsen, dean of graduate study at the University of California. Eighty per cent. of air-borne sound can be eliminated by their use, Dr. Knudsen declares. The ear defenders are plugs three-fourths of an inch long. Such plugs might go a long way toward aiding people who have difficulty in going to sleep at night because of the roar of sounds produced by modern city life.

Science News Letter, September 3, 1938

RADIO

Newspapers by Radio

Sets Now in Use Demonstrate Practicability of Printing Your Morning Newspaper on Radio Set While You Sleep

By ROBERT D. POTTER

See Front Cover

IT WON'T be long before the weekly bridge game between the Jones and the Smith families may end up in a conversation like this:

"Well, it's midnight. You folks licked us tonight but we'll be back and beat you next time. If we hadn't finessed the wrong way on that little slam hand. . . ."

"Aw, forget the post mortems. Stay around a bit and see our new radio facsimile receiver work. Let's see what's new in news."

And so the Smiths stay on, and on, and on, watching the Jones' facsimile receiver produce, before their eyes, a small edition of the morning newspaper.

Throughout America today there are some hundreds of fortunate "Smiths" who own pioneer radio facsimile receivers. Within a year or two there are going to be several hundred thousands of them, and possibly a whole lot more.

Has Many Uses

What is radio facsimile? Simply a method of turning the black and whites and grays of writing or print, of a photograph or drawing, into suitable radio signals, the transmission of these signals through space to a suitable receiver and there turning the signals back into a replica of the original material. Bank checks, signed in London, have been transmitted across the Atlantic Ocean and honored in New York. Fingerprints of suspected criminals have been similarly exchanged between police departments. And weather maps, prepared on shore, are daily radioed to steamships in mid-ocean.

Technically radio facsimile is closely related to the transmission of the popular "wire photos" which today grace many a modern newspaper. Such pictures are transmitted by electrical signals carried over wires. Except for details it matters little whether the electrical signals are carried over wires or by radio waves.

Now that radio facsimile is entering the homes of many Americans it may seem, to some people, that here is a new marvel of science which has burst into use suddenly; and for many people without warning. Yet radio facsimile, and its relative wire facsimile, already possess considerable antiquity. In fact, wire facsimile reproduction dates back nearly a century, when two Englishmen, Bain and Bakewell, in 1840 were credited with the transmission of drawings over wires.

Code Transmission

It was nearly sixty years later before wireless came into being with the developments of Marconi. But hardly was wireless conveying words through space, than pictures and drawings likewise were being crudely transmitted. Hans Kundson in 1908 sent pictures for short distances. At the beginning of the World War Prof. Arthur Korn, in Germany, was breaking down pictures into a rather simple code, sending the code message by wireless and then—on decoding at the receiving end—obtaining very recognizable likenesses of the original material transmitted.

How can you send a picture by code? Take a magnifying glass and look at a reproduction of a photograph in your daily newspaper. You will note that the pictures, which at first glance seem to have continuous tone gradations, really consist of multitudes of dots, varying in size, spacing and blackness.

With this bit of background you can code a picture in the following manner. Imagine a photograph, drawing, or a printed page covered with a tissue-thin sheet of cross-section paper. Each square can be given a position by letter and number as one marks the squares of a chessboard. You can add a third symbol designating various degrees of blackness.

Thus 1-A-1 might be the spot in row one, column one having a blackness rating of one. And so on. In Prof. Korn's later inventions and subsequent ones by others the coding and decoding of the picture were done automatically by machines.

Coding, however, is a rather artificial way of transmitting pictures, drawings or printed text by radio and since the coming of the three-element radio tube it has been superseded by more direct methods.

By 1924 Capt. R. H. Ranger, then with the Radio Corporation of America, developed the system which transmitted pictures across the Atlantic and which has been the basis, since that time, of the ship-to-shore radio facsimile transmission of weather maps and other intelligence.

The receivers of these marine and trans-oceanic facsimile transmission have been large and costly affairs. The thing that is now new in facsimile for the home is that the mechanisms have been greatly simplified, reduced to a cost price within range of ordinary pocketbooks, and turned into essentially robot devices which merely require the owner to plug a cord into the nearest light socket.

Some of them automatically turn on when the aural programs of ordinary broadcasting are ended for the night and then, during the off hours, the mechanism prints—in the home—the news and pictures being transmitted. In the morning one has a long sheet of paper containing the various facsimile announcements. These stories, it must be emphasized, are not merely printing as obtained from a teletype machine but are replicas of the pages of a newspaper, with headlines, captions, layouts of pictures and all the other familiar marks of journalism.

Cost Still High

The current spread of facsimile home radio receivers has come about because of a ruling by the Federal Communications Commission that every radio station that transmits facsimile must install at least fifty home receivers in its territory. Owners of these pioneer home receivers are to be part of the general experiment and their job will be to serve as a yardstick for the reaction of the public to facsimile transmission.

How much do the present receivers for facsimile cost? The receiver built by R.C.A. sells to radio stations for $250 each in lots of fifty. The device of the W. G. H. Finch Laboratories sells for $125. Both companies state that these figures can be cut in half on large scale production. Thus $65 is about the lowest figure contemplated for the cost of receivers for some time to come, which means, among other things, that there is no present indication of anything like

the cheap "midget" radio receivers now on the market.

Now that facsimile in the home is a fact, one can sit down and think of many ways the job could be done. The RCA facsimile receiver turns the varying incoming radio signals into varying pressures between black carbon paper and white paper. Thus, on the latter, is marked a carbon copy which has the white, blacks and the grays of the original material being transmitted.

Many Possible Ways

Or, you might use the incoming radio signals to shoot out controlled sprays of ink and thus build up a picture. Or you might vary the intensity of a beam of light falling on a light-sensitive piece of photographic paper. Another trick would be to vary electric current passing through a moist electrolytic paper and have the chemical reaction produce the tone gradations. Finally, you might use special dry-electrolytic papers in the same way. The latter system is employed by W. G. H. Finch, whose equipment is now used by many stations.

The reception of facsimile is not too speedy by some standards of comparison. In the R.C.A. unit the copy is produced at the rate of about three feet an hour on a sheet of paper the width of ordinary business letters. The Finch receiver gets more copy per hour but the width of the paper is only four inches.

In both systems the cost of operating the device is almost negligible. A roll of paper for ten days' reception, four hours a day, costs only twenty cents. The electric current used to operate the machine is no more than it is for a comparable radio set.

Newspapers Safe

Enthusiastic writers have hailed radio facsimile as the thing which will render the newspapers obsolete. Thinking journalists and radio men alike, however, do not see that facsimile will ever supplant the newspaper.

In the first place the cost of receivers is high. At the $65 price (which is only being talked about, remember) one has sitting in the parlor the equivalent of an eight years' subscription to a newspaper. For that investment one has a machine which renders no unique service outside of the method of delivering the news. Radio, in contrast, offers the owner of a radio set a service of entertainment which cannot be duplicated in any other equally convenient way.

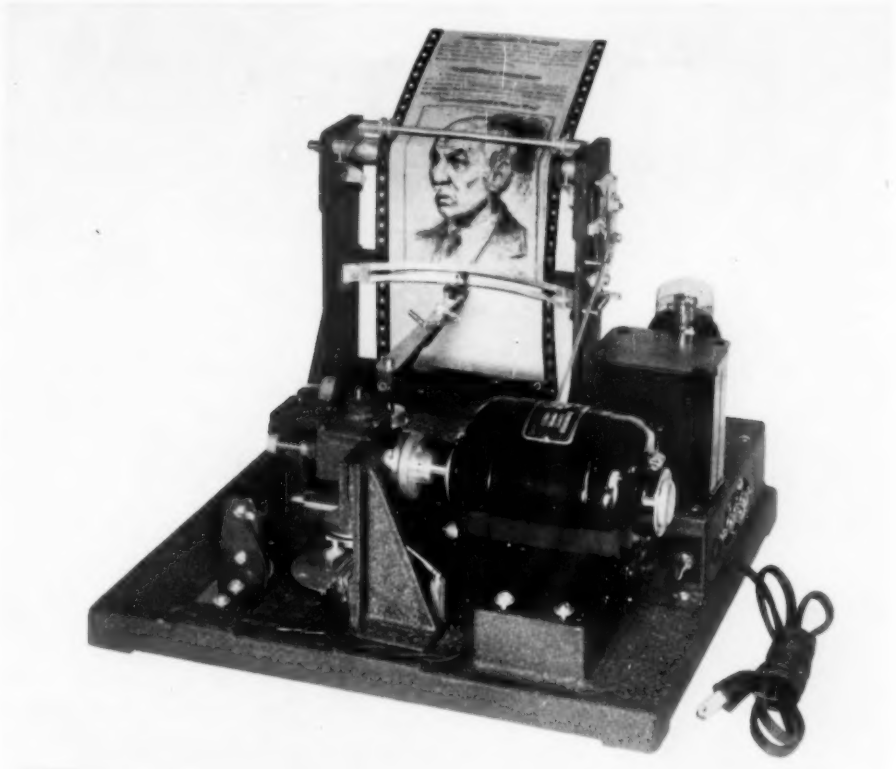
Moreover, journalism and the modern newspaper is something more than a collection of pieces of paper on which are printed words and pictures.

Behind every newspaper is a complex news-gathering agency. In the editorial office of the paper is the city staff, combing the city and its region for news of direct interest to the local readers. And behind all this stand the great, far-flung press associations, newspaper syndicates and other agencies collecting and preparing news from all corners of the earth.

If radio facsimile for the home wants to go into competition with these powerful existing organizations it will, at last resort, have to build up some equivalent organization.

Few people picture the rise of such radio news-gathering agencies and so it is probable that what finally will result will be an outgrowth of present news-over-radio methods, where there is close cooperation between the press and the radio. As a matter of fact, over half of the more than twenty radio stations which now have licenses to transmit radio facsimile are owned by newspapers. Until the speed of facsimile reception is greatly increased it will not be possible for facsimile to present the bulk and detail of news which is now offered by newspapers.

Readers of tabloid newspapers who like their news brief, "hot," and well padded with pictures, might be a potential market for facsimile. But one can be quite sure that they will never get their entire wish. They may get brevity and pictures but the sensationalism—either in news or pictures—will meet with the unofficial, but quite rigorous, arm of radio censorship which exists today in aural broadcasting.



THE MOVING FINGER PRINTS

This is a Finch radio facsimile set with the cover removed. The paper contains a dry chemical compound which responds to electric impulses by darkening. The motor-driven stylus sweeps back and forth across, carrying a varying current, thereby gradually building up the printed text and illustrations being transmitted.

Science News Letter, September 3, 1938

Earth Trembles

Information collected by Science Service from seismological observatories and relayed to the U. S. Coast and Geodetic Survey resulted in the location of the following preliminary epicenter:

Wednesday, Aug. 24, 8:27.7 p. m., E.S.T.
East Indies, near southwest coast of Sumatra. Latitude 3 degrees south, longitude 103 degrees east.

For stations cooperating with Science Service in reporting earthquakes recorded on their seismograph see SNL Aug. 13.

PLANT PHYSIOLOGY

Plants Can Hinder Or Help Each Other

DIVERSE social groups that just don't get along with each other often base their mutual dislike on things scarcely tangible yet very potent, like alien modes of speech or unaccustomed cooking odors. Dinty Moore's redolent kettle of corned beef and cabbage is more than a comic-section joke; it is the boundary marker between hostile cultural states.

Plants no less than human beings often develop feuds or friendships from much the same sort of subtle chemical causes. Dr. Gerhard Madaus, a German physician, has made a special study of some phases of this "chemical plant sociology," which started with his experimental plantings of drug plants but has been extended to take in the likes and dislikes of several varieties of crop plants as well.

Dr. Madaus calls attention first to the often-observed fact that the plant growth in certain types of evergreen forest is sparse, and poor in number of species. Most plants cannot tolerate the acid compounds from the trees' needles. He also cites experiments by American as well as German plant physiologists, wherein the mere presence of odorous plant substances, such as the scent of apples, oil of bergamot, or turpentine, accelerate seedling growth in light but hinder it in darkness.

Of greater economic significance, possibly, are his experiments with paired species grown together and separately. Thus, he found that corn and wheat planted in the same pot produced a more rapid growth of wheat. Bean seeds in water that had bathed the roots of oats sprouted more quickly than did similar seeds in water from corn roots. Grapevines with cypress spurge (a common vineyard weed) growing close to their roots failed to set fruit. In some instances it is known that root secretions are responsible for these mutual effects, and it seems quite likely that similar substances act in like manner in other cases.

Science News Letter, September 3, 1938

BOTANY

Earth's Little Stars Respond to Weather

STARS in the heavens are serenely indifferent to clouds and rain, but the little stars that are of the earth, earthy, respond readily to such influences. Earth-stars, the quaint little fungi that can be found in open places in autumn and even on snow-free soil in winter, have the fibers in the split segments of their leathery coats so arranged that they curl open when moist, and close again when they dry.

Science News Letter, September 3, 1938

SOCIOLOGY

Petty Gambling Costs U. S. $3,500,000,000 a Year

THE WORD gambling may bring to your mind pictures of race tracks and roulette wheels, but a recent survey indicates that half of America's estimated $7,000,000,000 yearly gambling bill is accounted for by the petty gambling of Mr. and Mrs. John Doe, and Junior.

The slot machine, the numbers game, the punchboard in the corner store and bank night at the neighborhood movie take in quantities of cash during a year. Lodges organize raffles. Office groups have pools on the baseball game. Churches have "Bingo" parties and firemen's carnivals their "Corn Games" and wheels of chance. Hospitals have their sweepstakes.

The pinball machine, that often escapes anti-gambling laws by a liberal classification as "games of skill" when the pay-off is in merchandise, takes in from $7.50 to $10 a week for each machine, it is estimated.

In addition to all this public gambling, there are always the more private forms over bridge, dice and in bets on every subject under the sun.

In good times, John Doe gambles because he has plenty of spending money. In bad times, he gambles because he is more than ever anxious to get something for nothing, it is pointed out by investigators of the Northwestern National Life Insurance Company in commenting on their survey.

Officials cite the human urge to gamble as explanation of the ineffectiveness of drives to abolish gambling.

Nevertheless, the eighth grade arithmetic class of Riverside, Ill., is credited with abolishing the slot machines and punchboards in that town.

A slot machine made its appearance in the classroom there as a practical demonstration of the "heads-I-win-tails-you-lose" scheme of operation of such devices. Presumably not "loaded," the machine nevertheless returned only 59 cents on the dollar. The children asked whether such machines were not forbidden by law. When assured that they were, they presented their findings and the location of three slot machines and 22 punchboards to the village board.

The board decided to enforce the ordinance.

Science News Letter, September 3, 1938

VETERINARY MEDICINE

Vast Savings Brought About Through Use of Tuberculin

Great Improvement in Health of Herds During 20 Years Told by Government Scientist at International Congress

FORTY million dollars lost every year to the American cattle industry in the pre-war period has been turned into a saving through elimination of tuberculous animals, Dr. John R. Mohler, of the U. S. Department of Agriculture, told the Thirteenth International Veterinary Congress in Zürich.

In 1917 the incidence of tuberculosis was 4.9 per cent. in American cattle herds; in 1937 the figure had been forced down to 0.4 per cent. During the twenty-year period about 3,500,000 diseased cattle had been detected and removed from the herds.

Crucial test comes at the slaughter house. If post-mortem examination necessitates the condemnation of a butchered animal at the threshold of the market, it is literally a dead loss. During the fiscal year ending June 30, 1938, such condemnations in American packing plants numbered only 6,284, Dr. Mohler reported; as recently as 1933 the year's condemnations totaled 23,214.

The test universally used to detect tuberculous cattle is the injection of tuberculin into the skin. Tuberculin is a vaccine-like preparation made from bacteria grown in flasks on an artificial medium. If the animal is healthy, nothing happens after tuberculin injection. But if it is diseased, an acute local inflammation appears around the point of injection. The animal must then be destroyed.

The great majority of competent veterinary surgeons accept the tuberculin test as valid and accurate, Dr. Mohler declared. Despite vehement opposition by a relatively small group, he stated, important court decisions have sustained the position of the profession and of the U. S. Department of Agriculture. A final check on the accuracy of tuberculin testing is furnished by the routine post-mortem examination of all beef carcasses in packing plants, which number about ten million a year.

The Department of Agriculture now has a list of accredited tuberculin-tested herds, in which three successive tests have shown no diseased cattle present. There are now more than 275,000 such accredited herds in the country.

The Department also has a list of what are termed "modified accredited areas." These are areas, usually counties, in which tuberculosis has been demonstrated in less than one-half of one per cent. of the cattle, and all diseased animals removed. As of Jan. 1, 1938, 99 per cent. of all the 3,071 counties in the 48 states were on this accredited list.

Science News Letter, September 3, 1938

PSYCHOLOGY

Four Sensory Capacities Underlie Musical Ability

YOU need not be a great composer or an orchestra leader to be credited with the blessing of a musical mind.

Musical talent is bestowed on man in a great variety of forms and degrees, and the ignorant railroad worker enjoying the rhythm of his hammer blows has his share just as does the suave critic at the opera.

Underlying all musical ability are the four sensory capacities of apprehension of pitch, loudness, time and timbre, it is pointed out by Dr. Carl E. Seashore, psychologist student of music talent, in analyzing the musical mind as part of his new book, *Psychology of Music*.

These four capacities, and their more complex forms, the sense of tone quality, of volume, of rhythm and of consonance, Dr. Seashore calls the four great branches of the musical family tree. They are inborn and are fully developed in the very young child. By the age of ten they can be measured, so that the child's native musical talent can be estimated before his training begins.

A great musician tends to have these four trunks of capacity branching out in balanced and symmetrical form, but in most of the less distinguished musical minds some one branch is dominant.

Musical achievement does not depend upon great capacity in all these lines, Dr. Seashore says, so long as the individual follows the line of his ability. If a person has only average sense of pitch, for example, he should not try to be a singer or violinist, but he may become a pianist of great distinction.

With the underlying trunk of sensory capacity, the musical mind has the ability to hear with his "mind's ear." He must live in a world rich in auditory images. He must be able to hear over music in memory and create new musical structures in his imagination.

The musician must be able to think musically. He must have musical intelligence.

And finally he must be able to feel musically, and express a wealth of emotions in music by esthetic deviation from the regular and rigid.

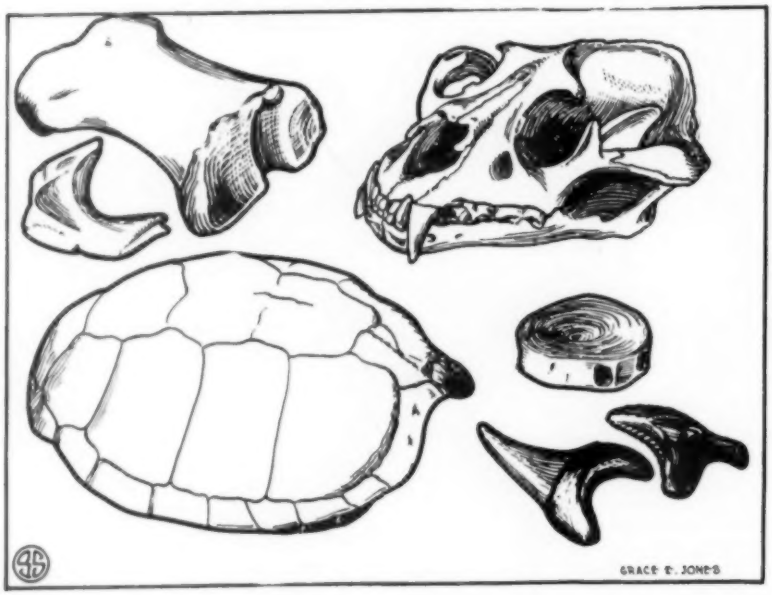
Science News Letter, September 3, 1938

Bears are clumsy and have poor sight, yet Yellowstone Park naturalists cannot convince all the tourists it is dangerous to feed bears from the hand—result: 56 hurt tourists reported so far in 1938.

Inexpensive Summer Fun

Bones, Turtle Shells Make Attractive Collection

(Last of a series of 12 articles.)



BONES, turtle shells and other discarded animal parts are very nice things to collect—though they sometimes encounter unsympathetic family opposition. If they haven't been lying in the woods until they are thoroughly bleached there may be reasonable basis for such opposition, but if they are really nice and clean and white, objection has really no basis but prejudice. If your bones will pass the nose-test, that ought to be sufficient.

Of course, there is a certain limit imposed by size. If you come upon the well-bleached skull of a long-gone horse or cow, it is a bit large, perhaps, to have indoors. But there will surely be some place outside where it may be kept. And the really interesting skulls of smaller things—rabbits and squirrels, cats and dogs—can very properly claim house room. So can such things as vertebrae and the smaller limb-bones.

In some parts of the country, especially in the East and the Rocky Mountain regions, where there are deer, antlers are fairly easy to find. Every male deer grows and sheds a pair every year, so that for each buck's lifetime there will be anywhere from four to eight or ten pairs of antlers. In the few places where there are elk and moose, their larger antlers are specially proud prizes. It is rare, however, to find a perfect moose antler—porcupines chew them up.

Much easier to find are the shells of turtles. In all except the driest parts of the country, these interesting little reptiles are very numerous. Their shells, as the solidest part of them, last longest after their inhabitants have departed this life. You'll have to watch your collection, though, if you have any turtle shells; they make such handy ash-trays!

Another type of reptilian relic that is fairly easy to come by is snake skins. These, like deer antlers, are shed periodically, so that every snake will produce several skins during its lifetime. They will always be somewhat rumpled and disordered, like the discarded garments they are. (Incidentally, it's bad manners as well as bad business policy to kill snakes; they are very useful animals, paying for their place in the world by killing vermin.)

The bones you find are not always necessarily of animals that died only a year or two ago. There are places, fairly well scattered over the country where fossil bones and teeth embedded in earth but not yet petrified, are washed out in creek banks, shore bluffs, gullies, etc. In peat bogs, where ditches are being cut, you will often find wood, roots, leaves, and other plant remains. They will be dark brown or black, but otherwise will look as though they had been dropped there only a few months ago, instead of many thousands of years.

For more information about collecting skulls and bones and a list of books and pamphlets on the subject, send us a postcard with your name and address. Ask for Bulletin 12. Address Science News Letter, 2101 Constitution Ave., Washington, D. C.

Science News Letter, September 3, 1938

PHYSICS

Science Has Own Atomic "Eleven" of Particles

FOOTBALL season is at hand. Already potential "All-Americans" are being mentioned in the press from this year's crop of players. Little-realized but vastly more important than any All-American football team is the "eleven" of fundamental particles which form the building blocks out of which all matter is composed.

For the right side of the atomic "line" three of the basic atoms in the universe are nominated. At right end is Hydrogen; light, mobile and fast. At right tackle is the potent and massive "heavy hydrogen" known as Deuterium. At right guard you could place the still more massive and heavy Helium atom.

At the left end of the line there would be the Proton, hydrogen's electrically-charged brother. At left tackle would be Deuterium's ionized counterpart, the deuteron particle. And at left guard would be the familiar Alpha particle, electrically-charged nucleus of the helium atom.

As on most good football teams, a fast, rather light center would be used. Here the newest particle of all is nominated. On your scoresheet it can have no name since it has not yet been named and indeed was only reported a year or so ago by Drs. Carl Anderson and Seth Neddermeyer of the California Institute of Technology and by Drs. J. C. Street and E. C. Stevenson of Harvard University.

The atomic backfield could consist of a quarterback "ghost", the neutrino; yet unfound but whose presence is indicated in all modern atomic theories. At right halfback and left halfback, respectively, you could place the electron and positron; the versatile, basic particles exactly identical in weight but differing in electrical charge. And at fullback, with plenty of weight and a keen ability

to pierce the barriers of opposing lines, would be the neutron, the non-charged particle weighing nearly as much as proton, at left end.

Don't be worried if you have trouble with the names on this atomic "eleven". Remember that radio announcers too, have their troubles with the names of football players on some of the major elevens of the country.

Science News Letter, September 3, 1938

GENERAL SCIENCE

Electrons, Corn, Bible Story, Figure in Smithsonian Report

ELECTRONS are very small — the smallest things known in the universe. They are very young, scientifically speaking—men have known of their existence for only about thirty years. Yet in that short time those tiny things have wrought a social and industrial revolution so great there is no way of measuring it, Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, declares in the new annual report of the Smithsonian Institution.

Fruits of Research

The men who pioneered in this small but enormously important discovery had no notion that their researches would ever make a dollar's worth of difference to the practical world. They were pure researchers, taking the cosmos apart merely to see what makes it tick. Yet vast factories hum today, and millions of dollars change hands, because of their scientific inquisitiveness.

Dr. Compton cites the importance of what he calls electronic devices. That means, nowadays, the key-mechanisms of electrical and communication industries: radio, long-distance telephony, the "talkies," neon signs, photocells that do everything from opening doors to catching burglars, thyratrons and kindred devices without which modern electric power plants could not run.

Electrons mean billions of dollars to the world of today. But in addition to that, and above it in importance, they function in the medical arts for the healing of our bodies, and they have become potent tools in the hands of scientists for the wresting of still further secrets from the storehouse of nature.

Botanists are seriously considering how to improve the corn plant.

Perhaps that does not sound extraordinary. Plant breeders are continually busy improving vegetables and fruits. Why mention corn?

The extraordinary fact regarding corn is this: For 400 years, white men in America have used the Indians' greatest gift almost the way Indian farmers gave it to them. The only notable changes, according to J. H. Kempton, botanist of the U. S. Bureau of Plant Industry, are that white men have discarded the gaudy red, blue, and black colors of Indian corn, and have made the crop more uniform by preserving the best of the Indian product.

This does not mean that our corn is primitive, poor stuff. Far from it.

Mr. Kempton, who discusses our use of this inherited plant in the report, pays tribute to the success of Indian farmers with the corn plant. He suggests that the Indian may have done a better job with corn because he was not trying at the same time to improve domestic animals. But whatever the Indian's secret, it is the botanist's verdict that "he created the world's most highly developed grain."

Greater Things to Come

Yet greater things are predicted for corn. When scientists became aroused to the importance of Gregor Mendel's experiments with garden peas, and realized that laws of heredity had been worked out in garden flowers, then the corn plant became a favorite subject for the great new study of inheritance in plants. The amazing corn plant has shown hundreds of mutations. Possibility of improving the well known varieties is evident, as the study of gene interaction advances.

Even now, Mr. Kempton states:

"Hybrids far surpassing the best varieties have been obtained, and a system devised for their commercial use."

Bible hero Daniel of lions' den fame, whose life and prophecies in Babylon have long been argued over by scholars, is now linked with a Canaanite myth.

Writings unearthed at Ras Shamra, ancient ruined seaport in Syria north of Palestine, include a long legend about a wise and good man named Danil. This Danil, says Dr. Zillig S. Harris in the report, "must be the Canaanite myth hero referred to in Ezekiel 14:14 and used as a model for the Biblical story of Daniel." Some scholars have held that the Book of Daniel was written long after the era of Israelite captivity in Babylon it describes, and that its religious value rests on its teachings regardless of historic preciseness.

On tablets found at Ras Shamra, the old Phoenician-Canaanites of the Bible world are for the first time speaking for themselves to explain their religion. Dr. Harris states that many cult practices of the Hebrews, the animals chosen for sacrifice, and some of their moral proverbs were borrowed from these neighbors. However, he declares, Hebrew culture remained fundamentally different from the Canaanite.

Science News Letter, September 3, 1938

ENTOMOLOGY

Scorpion Stings Declared Dangerous, Often Fatal

SCORPIONS are not to be regarded lightly, declares H. L. Stahnke of Mesa Union High School. (*Science*, Aug. 19) Mr. Stahnke disagrees with another writer in an earlier number of the same journal, who claimed that scorpion stings and tarantula bites are nothing to be afraid of.

"More lives have been lost in Arizona from the sting of the scorpion than from the bite or sting of any other venomous arthropod or reptile at least during the nine-year period since 1929," he writes. "For a period of six and one half years, beginning with 1929, there were recorded twenty-five deaths resulting from the sting of the scorpion and only ten deaths caused by the rattlesnake, gila monster and other poisonous animals.

"Most of the deaths due to scorpion sting have occurred in the southern part of the state, particularly in the Salt River Valley, and the victims have been children usually six years of age and under. The writer knows of one case in which an eight-year-old child succumbed to a scorpion sting."

The Mexican government's Institute of Health donated two ampullae of anti-scorpion serum, Mr. Stahnke states, adding, "In all cases it has proved entirely effective, and no deaths have resulted from scorpion sting, even though the serum was used in quite advanced stages of poisoning."

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•First Glances at New Books

Psychology

THE BETRAYAL OF INTELLIGENCE: A PREFACE TO DEBUNKING—Joseph Jastrow—*Greenberg,* 170 p., $1.50. Perhaps one reason why men love to be humbugged is because the exploiter is so often delightfully entertaining. In the case of this volume, truth and scientific thinking are presented in brilliantly interesting form. It may provide many with a new defense against propaganda.

Science News Letter, September 3, 1938

Physiology—Juvenile

LET'S STAY WELL—Mary L. Hahn and Charles-Edward Amory Winslow—*Merrill,* 186 p., illus., 72 c. This health education text for third or fourth grade pupils takes the form of a story about how a group of children learned and practiced their health lessons. The book is interesting and simple and could be used for health education in the home as well as in schools.

Science News Letter, September 3, 1938

Physiology—Juvenile

LET'S GROW—Mary L. Hahn and Charles-Edward Amory Winslow—*Merrill,* 186 p., illus., 72 c. This simple and interesting text for health instruction in third or fourth grade supplements the authors' other volume, *Let's Stay Well.* The emphasis in this volume is on health practices rather than physiology. Chapters on Cold Weather Fun, Rainy Day Fun, Knives, Hammers and Fingers, and a set of riddles are interesting innovations in this type of book.

Science News Letter, September 3, 1938

Chemistry

METHODS FOR THE DETECTION OF TOXIC GASES IN INDUSTRY: HYDROGEN CYANIDE VAPOUR—Gt. Brit. Dept. of Scientific and Industrial Research—*British Library of Information, New York,* 13 p., charts, $1.65.

Science News Letter, September 3, 1938

Agriculture

MILK PRODUCTION—Josephine Perry and Celeste Slauson—*Longmans, Green,* 119 p., illus., $1.50. Children, as the largest consumers of milk, are entitled to know more about it than they usually get a chance to. This book has been produced in response to demand by teachers in the grade schools, and is well adapted for its purpose.

Science News Letter, September 3, 1938

Photography

HELPS FOR BEGINNERS—Arthur Hammond—*Amer. Photo. Pub. Co.,* 72 p., 50 c. A useful little paper-bound book for anyone preparing to mount the popular hobby of photography. Advice helpful in selecting the first camera is followed by the information necessary to enable you to take good pictures and develop and print them.

Science News Letter, September 3, 1938

Geology

THE TETONS: INTERPRETATIONS OF A MOUNTAIN LANDSCAPE—Fritiof Fryxell—*Univ. Calif. Press.,* 77 p., illus., $1.50. Geology in terms that the average educated traveller can understand, and styled so that he will find pleasure in reading it. The book is conveniently small, so that it can be carried in coat pocket or handbag while you are on road or trail in the Teton country.

Science News Letter, September 3, 1938

Anthropology

THE AGRICULTURAL AND HUNTING METHODS OF THE NAVAJO INDIANS—W. W. Hill—*Yale Univ.,* 194 p., 4 pl., $2.50. The rituals and the techniques of Navajos in two important activities are described in detail. The author concludes that Navajo Indians have fundamentally the same kind of culture as that of the Great Basin, but were influenced at some past time by Plains Indian culture.

Science News Letter, September 3, 1938

Biography

THREE PICTOGRAPHIC AUTOBIOGRAPHIES OF SITTING BULL—M. W. Stirling—*Smithsonian Institution,* 57 p., 46 plates, 75 c. Not content with getting his name into print more often than any other Indian, Sitting Bull had a penchant for telling his own story in pictures. The pictures, typically showing Sitting Bull sitting on a horse and shooting it out with a white man in a top hat, are fortunately explained by brief text.

Science News Letter, September 3, 1938

Education—General Science

EDUCATION AND SCIENTIFIC RESEARCH IN SWEDEN—Fr. Sandberg and Börje Knös—*Bonnier, Stockholm,* 77 p., $1. Facts about universities and research institutions in this nation whose ties with America are being celebrated this year.

Science News Letter, September 3, 1938

Physiology

STUDIES IN FETAL BEHAVIOR. 1. FETAL HEART RATE AS A BEHAVIORAL INDICATOR—L. W. Sontag and T. W. Richards—*Soc. for Research in Child Development, National Research Coun.,* 72 p., $1.

Science News Letter, September 3, 1938

Sociology

THE FAMILY AND THE DEPRESSION: A STUDY OF ONE HUNDRED CHICAGO FAMILIES—Ruth Shonle Cavan and Katherine Howland Ranck—*Univ. of Chicago Press,* 209 p., $2.50. What does economic disaster do to the family? Although we have recently been going through a great depression, scientific study of this aspect of its effects has been lacking. This research reveals that effects are both psychic and social, as revealed in excessive worry, nervous breakdown, suicidal thought and attempts, as well as in changes in standards of living, in family roles and in families and personal objectives.

Science News Letter, September 3, 1938

Population

GEOGRAPHIC ASPECTS OF INTERNATIONAL RELATIONS—Charles C. Colby, ed.—*Univ. of Chicago Press,* 296 p., maps, $3. Here are the lectures and round-table papers that made up the Thirteenth Institute of the Norman Wait Harris Memorial Foundation, which brought out three major concepts: that large overseas outlets for population no longer exist, that through state intervention in economic life the world has a new international pattern, and that internal policies adopted by nations may yield profound international complications.

Science News Letter, September 3, 1938

Geography

OUR COUNTRY FROM THE AIR—Edna E. Eisen—*William Morrow,* 212 p, photographs facing each page of text, $2. A novel and interesting manner of presenting geography for children. An effective presentation of the aerial photographer's claim that he is turning out the best maps of all.

Science News Letter, September 3, 1938

Psychology

ELEMENTS OF PSYCHOLOGY, AN INTRODUCTION—Albert Clayton Reid—*Prentice-Hall,* 409 p., $2.50. A textbook from Wake Forest College.

Science News Letter, September 3, 1938

General Science

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION, 1937—*Govt. Print. Off.,* $1. See page 159.

Science News Letter, September 3, 1938

Psychology

PSYCHOLOGY OF MUSIC—Carl E. Seashore—*McGraw-Hill,* 408 p., $4. See page 157.

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